

A quarterly newsletter published by the Rhode Island Department of Health (HEALTH) to provide information on trends and issues regarding toxic substances and biomonitoring activities in Rhode Island.

HEALTH Selects Environmental Chemicals to Study

Progress continues toward developing a biomonitoring plan for HEALTH

By Mike DiMatteo* and Dhitinut Ratnapradipa**

**Laboratories and **Environmental Health Risk Assessment*

Recently, the Biomonitoring Assessment Team at HEALTH, composed of key staff from several divisions, selected mercury and cotinine as the environmental chemicals to study in humans, out of a group including these and two others, arsenic and pesticides. HEALTH chose the strategy of selecting two in order to continue with progress in developing a successful biomonitoring plan. The Team will now begin work on designing studies which will accurately measure these chemicals in identified populations potentially impacted by their negative health effects. This initial planning phase of the biomonitoring program at HEALTH is laying the groundwork for a potential grant award from The Centers for Disease Control (CDC) to increase laboratory capacity and develop an effective biomonitoring program at the State level.

To complete the selection process, the Team first developed a number of criteria that would enable them to make an informed decision about the two chemicals that presented the strongest case for achieving the main goal of the biomonitoring program; to provide public health officials with a tool for making more accurate and effective decisions about preventing illness and improving public health. More specifically, HEALTH hopes to use results from biomonitoring studies to assist federal and state agencies in protecting the public health during emergencies involving chemicals, investigate possible exposures of people to dangerous chemicals, and to study the effects of chemicals on health.

The criteria for selecting the chemicals included the following:

- morbidity and mortality burden (potential health effects)
- the uniqueness or significance of the chemical to RI
- the health impact; or, the usefulness of obtaining results to affect health changes

- analytical considerations including laboratory equipment and methodologies and respective current capacity at HEALTH Laboratories
- specimen considerations including access and handling requirements

As you may imagine, much research had to be done in order to provide accurate and useful data. Information was gathered from a Scientific Advisory Board (SAB) formed at the inception of the project, which consists of academicians, scientists and physicians from the community. In addition, a community conference was recently held (see sidebar article for more details) to gain input on the concerns and priorities of

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HEALTH Holds Successful Community Conference

By Dhitinut Ratnapradipa and Mike DiMatteo

HEALTH and co-sponsor Clean Water Action held a community conference on September 28, 2002, at the University of Rhode Island Providence Campus.

The keynote speaker John P. Myers, co-author of the groundbreaking book, *Our Stolen Future*, highlighted the conference. John gave numerous examples of studies and events, which detail the effect of environmental chemicals on human and animal health and their prevalence in our modern industrialized world. He convinced participants that these 'toxic threats' need to be addressed *NOW* by scientists, government officials, and public health administrations. In this regard, he commended the efforts of HEALTH and other groups in responding to this crisis through programs such as biomonitoring. After John's presentation, Lee Ketelsen from Clean Water Action discussed mercury contamination and Margaret Kane from the American Lung Association of RI discussed Second Hand Smoke prevalence. Also, Dr Anatoly Zhitkovich from Brown University described arsenic contamination in soil. Participants next broke into small groups and generated information useful to HEALTH in designing its' biomonitoring plan.

To view a report of the community conference, visit the HEALTH website at www.HEALTHri.org.

the community. Finally, many knowledgeable staff from several of HEALTH's divisions and offices including Environmental Health, Laboratories, Disease Prevention and Control, Family Health, Communications, and others, provided support.

Now, what makes mercury and cotinine so attractive compared to the others? Well, first let's make it clear that all of the potential chemical candidates present strong reasons for doing biological monitoring. But, the adopted strategy to select two required the Assessment Team to choose. And so, they determined that the primary concern for mercury is exposure of pregnant women (and subsequent exposure of the fetus) and children through fish consumption. A recent study of an Internal Medicine practice in San Francisco, California concluded that a substantial fraction of patients had diets high in fish consumption; of these, a high proportion had blood mercury levels exceeding the maximum level recommended by the US EPA and National Academy of Sciences (NAS). In addition, the mean level for women in this survey was 10 times that of Mercury levels found in a recent CDC population survey. Levels in some children were more than 40 times the national mean (See hpnet1.niehs.nih.gov/docs/2003/5837/abstract.html). Other concerns include the exposure of persons performing certain religious or cultural practices involving elemental mercury, and industrial and dental profession workers.

Health effects for mercury have been studied and include developmental effects such as neurological damage and mental retardation. Also, neurological effects such as motor skill impairment and weakness.

Mercury exposure is certainly a chemical that affects RI's residents. HEALTH has issued a mercury advisory that recommends limiting the consumption of certain freshwater and saltwater fish from selected areas. To view this advisory, visit the HEALTH website at www.HEALTHri.org.

Conducting studies of mercury in people would most likely be first used at HEALTH to assess the background level of this chemical in representative populations. Knowing these levels would then make it possible to determine an appropriate public health response(s).

Mercury analysis is performed using a method called Cold Vapor Atomic Absorption (CVAA). HEALTH Laboratories has begun the process to develop the capacity for this analysis.

Finally, HEALTH is considering several study designs which may include collecting whole blood from readily available sources. This accessibility issue is important in that it increases the feasibility, or likelihood, of a conducting a successful study.

HEALTH hopes to use results from biomonitoring studies to investigate possible exposures of people to dangerous levels of environmental chemicals.

Now, on to cotinine, a metabolite (breakdown product) of nicotine, which CDC regards as the key biomarker for exposure to Environmental Tobacco Smoke (ETS).

According to CDC, ETS is a known human carcinogen that is estimated to cause 3,000 lung cancer deaths annually and is attributed to 150,000-300,000 cases of bronchitis or pneumonia per year. In addition, ETS may aggravate asthma, increase the incidence of middle ear infections, and may contribute to an increased risk of Sudden Infant Death Syndrome (SIDS).

ETS has a significant impact on RI residents. Although local smoking bans may exist, RI is not among the 4 States nationwide who have adopted statewide bans in restaurants. Anyone who dines out can attest that ETS is often present. But, did you realize that in one study conducted in 1993, ETS levels in restaurants were found to be 1.6 to 2.0 times higher than in office workplaces? What's more, levels in bars were found to be 4-6 times higher (see *Journal of American Medical Association*, 270:490-493, 1993). Now, reflect back on the health effects mentioned earlier and you can see the need for reducing exposure.

If awarded additional funding by CDC to conduct biomonitoring studies, HEALTH Laboratories plans to develop the capacity to conduct cotinine testing using its staff of skilled scientist and technologists. This is important to HEALTH since, according to Dr. Patricia Nolan, HEALTH Director, cotinine biomonitoring may provide a tool for judging the success of policy interventions to reduce exposure to ETS.

Currently, key project staff are designing cotinine studies that may include partnering with local hospitals and other organizations to obtain human specimens.

All told, HEALTH continues to make progress toward the development of a biomonitoring plan. When achieved, HEALTH hopes to increase its knowledge of environmental chemicals and respective exposures to RI residents, and using this knowledge, improve public health through changes in policy and practice. ❖

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